

THE
PSYCHOLOGICAL BULLETIN

PROCEEDINGS OF THE SIXTEENTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, CHICAGO, DECEMBER 31, 1907, AND JANUARY 1 AND 2, 1908.

REPORT OF THE SECRETARY.

The sixteenth annual meeting of the American Psychological Association was held at the University of Chicago, on Tuesday, Wednesday and Thursday, December 31, 1907, and January 1 and 2, 1908, in affiliation with the American Association for the Advancement of Science, the American Society of Naturalists and the Western Philosophical Association. The sessions were well attended, and, in spite of the enforced absence of some who had prepared papers for presentation, the proceedings were full of interest.

The sessions were held, for the most part, in the Law Building of the University. The Psychological Laboratory also served as an informal meeting place for the members of the association.

On Monday evening, December 30, a reception to the visiting societies was tendered by the President and Trustees of the University of Chicago.

On Tuesday morning, December 31, at 10 o'clock, the meeting was formally opened by the president, Mr. Marshall. After a brief preliminary business session, at which the nominations of the council for officers and new members were presented, and action taken which will be detailed below, the scientific program was entered on. The scientific proceedings are reported in the abstracts below.

On Tuesday afternoon and evening, the association held no sessions, the members attending, in the afternoon, the joint discussion before the American Society of Naturalists, on Coöperation in Biological Research, in which Psychology was represented by J. R.

Angell; and, in the evening, the annual dinner of the Naturalists and Affiliated Societies.

On Wednesday morning, January 1, was held a joint session with the Western Philosophical Association; the program consisted, first, of a discussion on the Relations of Ethics to Philosophy and Psychology, and second, of a symposium on Value.

The afternoon session of Wednesday was chiefly devoted to the Report of the Committee on Measurements, presented by the chairman, J. R. Angell. An abstract of the report is contained among the abstracts below.

The association adjourned at an early hour on this afternoon, to hear the address of Vice-president Elmer Brown of the American Association for the Advancement of Science before the Section of Education, on 'The Outlook for the Section of Education,' and also the address of President F. C. Sharp of the Western Philosophical Association, on 'The Problem of Objectivity in Ethics.'

On Wednesday evening was held the annual business meeting, after which the president gave his address on 'The Methods of the Naturalist and of the Psychologist.' This was followed by a joint smoker with the Western Philosophical Association at the Quadrangle Club, given by the Psychological and Philosophical departments of the University of Chicago.

Thursday, morning and afternoon, was devoted to the reading of papers and discussion.

The following business was transacted at the different sessions: At the preliminary business meeting on Tuesday morning, the council reported in the matter of two amendments to the constitution, which had been proposed at the 1906 meeting, and referred back to the council for consideration. The council recommended that the proposed amendment to Article IV., substituting two dollars in place of one dollar as the annual subscription, be laid on the table; and it was so voted by the association.

The council further recommended that the proposed amendment providing that 'by unanimous vote the council may drop any member who has not been engaged in the advancement of psychology for a period of five or more years' be likewise laid on the table. It was so voted.

At the session of Wednesday afternoon, it was voted that the Committee on Measurements be continued.

At the annual business meeting, held Wednesday evening, the following officers, nominated by the council, were elected: *President*

for 1908, Professor George M. Stratton, of the Johns Hopkins University; *Secretary and Treasurer, to serve three years*, Professor A. H. Pierce, of Smith College; for *Members of the Council to serve three years*, Professor Raymond Dodge, of Wesleyan University, and Professor R. S. Woodworth, of Columbia University.

On nomination by the council, the following candidates were elected to membership: Dr. Felix Arnold, New York City; Professor Thaddeus L. Bolton, University of Nebraska; Professor Burtis Burr Breese, University of Cincinnati; Professor Arthur Ernest Davies, Ohio State University; Professor June E. Downey, University of Wyoming; Dr. Grace Maxwell Fernald, Bryn Mawr College; Mr. Frank Nugent Freeman, Yale University; Dr. Francis M. Hamilton, New York Training School for Teachers; Professor Elmer E. Jones, Virginia State Normal School; Dr. Daniel P. Macmillan, Board of Education of Chicago; Dr. Howard D. Marsh, College of the City of New York; Dr. Elsie Murray, Vassar College; Professor Joseph Peterson, Brigham Young University; Professor William Carl Ruediger, George Washington University; Professor F. C. Sharp, University of Wisconsin; Professor Norman Smith, Princeton University; Professor George M. Whipple, University of Missouri; Dr. Mabel Clare Williams, Iowa State University.

On behalf of the council, the president presented the following report regarding the guardianship and utilization of the accumulated fund:

"In relation to the guardianship of the accumulated fund the council begs to report that in its opinion this fund, amounting to \$2,646.74, should be allowed to remain in the Union Dime Savings Institution of New York, to be drawn upon in future only by direction of the association at one of its annual meetings.

"It suggests however that the association give to the council authority to draw from the savings bank such part of the accumulated interest on this fund as may be found necessary to meet the necessary yearly expenditures of the association in case these are found to exceed its yearly income; no such drafts however to be made without the approval of three fourths of the members of the council.

"In relation to the utilization of this fund the council begs to report that it finds at present no special activity of the association which requires the expenditure of any money which might properly be drawn from this fund: and it therefore advises its maintenance as above till such time as the association shall formulate special work which would require its use in whole or in part."

It was voted that the above report be adopted and that the council be authorized to carry out the provisions thereof.

The assistant treasurer presented the treasurer's report, as given below. It was voted that this report be accepted and printed in the proceedings.

On recommendation by the council, the following amendment to the constitution was adopted by a majority vote: Making the present Article III. to be Article III., Section 1; and inserting the following as Section 2:

"In case of the death, disability or resignation of either of these officers, the council shall appoint a successor to serve until the next annual meeting of the association."

On the recommendation of the council that it be given power after consulting with other societies to select the place of the next annual meeting, it was voted that the matter of the place of the next annual meeting be referred to the council with power, and with instructions to decide as soon as possible and to report in the published Proceedings of this meeting.

(In accordance with this resolution, the council, at a meeting held in Chicago on January 2, 1908, voted that the next annual meeting be held in Baltimore, unless circumstances shall arise to make a change of plan desirable.)

It was voted that the association express its gratitude to the University of Chicago and to the departments of Philosophy and Psychology for their entertainment.

It was also voted to express the thanks of the association to the Quadrangle Club and to the departments of Philosophy and Psychology of the University of Chicago, for entertaining the association at a smoker.

It was voted that the Proceedings of this meeting be printed.

REPORT OF THE TREASURER FOR 1907.

DR.

To balance from 1906 meeting	\$2,770.17
Dues received from members.....	200.27
Interest from July 1, 1906, to July 1, 1907	76.57
	<hr/>
	\$3,047.01

CR.

Stationery and printing.....	\$101.00
Clerical assistance.....	40.40
Postage.....	12.95

Expenses of smoker at New York, 1906.....	10.00	
Travelling expenses	35.00	
Petty cash.....	9.80	209.15
Balance in Union Dime Savings Institution	\$2,646.74	
Balance in Fifth Avenue Bank.....	191.12	2,837.86
		<u>\$3,047.01</u>

Audited by the Council.

R. S. WOODWORTH,
Assistant Secretary and Treasurer.

ABSTRACTS OF PAPERS.

President's Address: The Methods of the Naturalist and Psychologist. HENRY RUTGERS MARSHALL.

(This address has been published in full in the *PSYCHOLOGICAL REVIEW*, Vol. 15, p. 1, 1908.)

Report of the Committee on Measurements. J. R. ANGELL,
Chairman.

After considerable unavoidable delay the committee was organized with the following membership: Angell, Judd, Pillsbury, Seashore and Woodworth. Professor Raymond Dodge was invited to coöperate upon certain motor tests of vision. Professor Yerkes was asked to undertake investigations on color stimuli for work with animals. Dr. Wells has coöperated with Professor Woodworth upon tests on association.

The committee offers its present report merely as provisional and indicative of progress. Owing to several causes, of which the delay in organization and the subsequent delay in securing apparatus are most important, a complete report is not ready in any of the fields of work entered upon. The committee expects to present a much more extended report at the meeting of the association a year hence.

The following subjects have been chosen for work: Measurement of the threshold for difference in color tone (Woodworth); Free and controlled association (Woodworth and Wells); Tests on color vision of animals (Yerkes); Discrimination of pitch (Seashore); Determination of auditory limen (Pillsbury); Tests on motor processes (Judd); Eye-movements as a general test of muscular and nervous fatigue (Dodge); Determination of ideational type (Angell).

The present degree of progress in each investigation was reported.

The committee asked for an extension of their term of office for one year, which was granted.

The committee earnestly requested that suggestions and criticisms

should be sent to the chairman of the committee, or preferably to the member conducting the investigation upon which such suggestion or criticism immediately bears. The committee especially desires the coöperation and assistance of persons engaged upon problems germane to these above mentioned. Full credit will be accorded to all such volunteer assistants.

Discussion: The Relations of Ethics to Philosophy and Psychology.

This discussion was held at a joint session with the Western Philosophical Association, and was followed by a closely related symposium on Value, the detailed account of which may be found in the Proceedings of the Western Philosophical Association. The remarks of the participants in the discussion were, in substance, as follows:

CHARLES H. JUDD. — This contribution to the discussion dealt only with the relation of psychology to ethics, leaving to others the treatment of the relation of philosophy to ethics.

The effort was made to show that the traditional introspective and purely descriptive forms of psychology contribute very little if anything to ethics. Thus the controversy between the libertarians and the determinists was very largely a controversy between those who believed in the certainty and completeness of introspective evidence and those who attempted to gain an objective view of the nature of human conduct. Again it was pointed out that the descriptive classification of mental processes into three, or even two great divisions is hopelessly confusing to any intelligent treatment of conduct.

A functional, genetic and social treatment of mental life is at once the most productive form of psychology and the essential psychological part of ethics. This statement was supported by reference to the current psychological view of the intimate relation between activity and what was formerly distinguished as pure cognition. It was further supported by reference to the recent development of psychological doctrines of such social institutions as language and religion.

Is it not true that ethics has maintained itself in the past as an independent discipline largely because psychology has not recognized its true sphere as a functional and genetic study of mental life? Is it not true that ethics now finds itself with the development of historical anthropology and institutional history on the one hand, and social psychology on the other, hard pressed for clear justification of its independence? Even with reference to the individual forms of behavior the development of what the Germans call *Begabungslehre* promises

to give us a new attitude in regard to personal responsibility. So that even the sphere of introspective psychology and personal ethics promises to be absorbed in a study of the natural history of behavior which is much more in keeping with present tendencies than any absolute and independent study of conduct and its canons.

E. H. LINDLEY. — We may not agree with Paulsen that every classification of the sciences is ultimately accidental and yet believe that boundaries are largely determined by the interests of the various guilds of scholars concerned. Each thinker tends to suffer the perspective illusion that the foreground is ample and inclusive and that the background regions remote from his interests are narrow and meager of content.

As a consequence of conflicting perspectives, and for other good reasons, as well, the sciences overlap and interpenetrate. They stand more nearly in a relation of coördinate mutualism than in the hierarchical order conceived by Comte.

One road to every science lies through philosophy. The reverse is also true. Philosophy as the critique of ultimate values, stands in peculiarly intimate relations to ethics and to psychology.

Psychology viewed as teleological is partly descriptive and partly normative. Ethics, while chiefly normative, is partly descriptive. Psychology deals with proximate norms. It evaluates *behavior*. Ethics deals with remoter consequences of behavior, with more ultimate norms. It evaluates *conduct*.

Although psychology has contributed most of the material which ethics judges, it can never contribute all. The physical and physiological conditions of conduct, no less than the economic and social conditions, levy tribute on other sciences.

Ethical truth has not all happened yet. The struggle for the most inclusive good will continue so long as men live. It will always involve the hazard of new fortunes. Thus the determination of ultimate values will wait on experience.

Philosophical principles must undergo modification and therefore ethical norms must change just as unwritten constitutions change — through the readjustments of principle to fact necessitated by unique situations. While held constantly in leash by the regulative categories of philosophy, ethics stands in special and imperative need, just now, of enrichment from hygienic and economic and social science.

G. M. STRATTON. — Writers on ethics are themselves very uncertain as to the proper aim and method of their work. With some, ethics is the critical, or scientific, attempt to determine by what princi-

ples man's conduct should be guided, what should be its ideal. With others the aim of ethics is very different from this; it is a purely descriptive science, an account of the various and successive conceptions of right or of obligation among men. A somewhat similar divergence of definition is found also in writers on logic and on æsthetics.

The relation of these sciences to philosophy and to psychology will appear quite different according to our own sympathies in such a conflict. If we incline to regard ethics, æsthetics, and logic as having only a descriptive, a reportorial office,—incapable of formulating any lasting principles of right and wrong in their fields,—then they appear as departments of psychology, and have that same general relation to philosophy which psychology is recognized to have; that is, their purpose is less fundamental than that of philosophy, more exclusively concerned with appearances, with direct experience, rather than with the underlying reality.

If we take the contrary view of ethics, æsthetics and logic, giving them a legislative purpose and not alone descriptive of actual fact, then they are felt to be more closely allied with philosophy, since one can hardly hope to determine the most general nature of right, of beauty, and of truth, without a philosophy. For the standards by which we appraise human effort are affected by our decision as to the deepest facts of human nature and man's relation to the whole.

It would seem to me well to preserve and keep before us the distinction between normative and descriptive sciences,—between sciences of actual fact and sciences of standards, of valuation, of critical appraisal; and to reserve the names 'ethics,' 'logic,' 'æsthetics,' for sciences of the latter quality. Yet this does not mean that these sciences need be entirely metaphysical, and should keep aloof from psychology; it means only that they have a peculiar aim that is not entirely psychological, and this aim should be recognized as dominant and their psychological interests as but ancillary. It seems premature to give up the hope of establishing canons of right, which is not the purpose of psychology at all. And on the other hand, there are many questions regarding action,—its rate, for example, and the exact sensations which precede or accompany it,—which are important for the psychology of conduct, but which have no visible importance for ethics.

It is by no means clear that the perfect fulfillment of psychology,—of genetic and functional psychology, even,—would of itself be the fulfillment of these other sciences in their wider and less agnostic

form. Such a complete psychology would lay bare the exact character of all our acts and would state completely their causal relations, but would not decide as to the final ideal of conduct, of enjoyment, or of thought. Psychology at its best could throw much light upon the means of accomplishing such ends as were adopted; and consequently the normative sciences should be intimate with psychology. But they cannot honorably resign in favor of psychology.

Since there are different kinds of work to be done, it would be unfortunate if their differences were concealed and not kept clear by our names. If anyone is interested in a piece of work which is primarily descriptive, is primarily concerned with actual and historic fact, then it would seem best so to designate it,—as, for example, the psychology of obligation, or of enjoyment, or of judgment, as the case may be,—reserving the terms ‘ethics,’ ‘æsthetics,’ ‘logic,’ for those studies where the establishment of fact is intended merely as preliminary and helpful to the establishment of standards of preference, of canons of right in a particular field, together with any subsidiary rules by which we may be guided to conform to such standards or canons.

The Genesis of Rhythm. MAX MEYER.

The term rhythm is not used here as meaning a mere repetition, a mere periodicity, but a grouping together of elements occurring at regular intervals so that one of a definite number of elements is stronger than the others, has an accent. It has usually been taken for granted that the ability to act and to perceive rhythmically is an endowment of the human race. Some psychologists have thought that this view is supported by the fact that animals do not possess rhythm and that rhythm is restricted to definite forms, the groups of 2, of 3, and of combinations of these. His own experimental experiences have led the present investigator to the conclusion that rhythm is nothing but an habitual form of nervous activity, which can be acquired like any other habit if the right methods are used in learning it. That animals do not possess rhythm seems to be due chiefly to the fact that their lives are governed by instinct rather than habit, so that they do not have sufficient opportunities for acquiring any one of the rhythm habits. Even human beings differ widely in their rhythm habits, although most of them acquire the 2 and 3 groups more or less effectively in early life. That rhythm is restricted to the groups of 2 and 3 elements is not true. Rhythm forms of 5 and 7 elements in the group can be acquired, provided proper, that is, economical methods of establishing the habit are

used. The experimental work now in progress at the University of Missouri has for its aim the discovery of the conditions to be fulfilled in order to have an individual acquire with the least expenditure of time a special rhythm habit which thus far he has not acquired accidentally.

A Test of Musical Ability. MAX MEYER.

Tests of pitch discrimination have often been labeled by psychologists tests of musical ability. This is unjustifiable, for pitch discrimination plays no rôle in musical perception. Stumpf has recommended his fusion experiments as a test of musical ability. These experiments, however, offer so many technical difficulties when applied to a class of average subjects, that they can hardly be used for this purpose. An easily applicable class test of musical ability is the following. A common chord in any of its three positions is played on a piano or organ, one of the three notes of the chord is then played in the bass, and the subjects are asked if the bass note can be regarded as a representative of the whole chord or not. Even those subjects who have never heard of a fundamental tone, or tonic, or key-note, soon grasp, after a few preliminary experiments, the significance of the question. This test was used in three classes of college students of a total membership of 71. The total number of judgments pronounced was 1,773. Of these 52 per cent. were Yes, 48 per cent. No. Maybe the average human being, in a doubtful case, will say Yes rather than No. The percentage of right judgments was 71, of wrong ones 29. This shows that the test is well applicable to an average class, since the extremes possible in individual cases are 50 per cent. and 100 per cent. of right answers. The table shows the distribution of the subjects according to the correctness of their answers, or, as we may say, according to their musical ability.

Range of percentage,	50-60	61-70	71-80	81-90	91-100
Number of subjects,	17	18	16	12	8

Training seems to have but little influence on the outcome of the tests. Some subjects who had not as much musical training as would result from singing in a chorus for a few months, nevertheless gave 90 per cent. right answers. On the other hand, some subjects who had received regular instruction in piano or voice, were found to be in the lowest class when their musical ability was measured by the test above described.

Fifteen of these subjects were also the subjects of tests in proof-reading and in arithmetic. The following correlations were found to exist between the three abilities mentioned.

Arithmetic and proof-reading,	+ .52
Arithmetic and music,	+ .46
Proof-reading and music,	— .10

That the correlation between the ability to read proof and musical ability is negative, is not astonishing, since the one is a function of the visual, the other a function of the auditory sense.

A Study in the Analysis of the Memory Consciousness for Familiar Sounds. F. KUHLMANN.

Groups of familiar sounds were presented to the subjects by the graphophone. Detailed introspections were required of the subjects after different time intervals of days or weeks, on the manner of the recall of the sounds, the nature, order, and use of the different imagery and sensory processes that entered the recall process. They also in each case measured from memory the duration of the sound, by turning a key of a recording apparatus.

In the recall visual, verbal, and motor processes entered for the reinstatement of the auditory imagery in detail. Visual imagery preceded the auditory in fully half the instances, verbal processes in about a fourth, and motor imitation of pitch and quality or of rhythm preceded least frequently. The function in recall of these three differed. (1) Of the visual imagery itself three classes appeared that were used differently. (a) A rough and incomplete visual image of the thing associated with the sound, used merely to get the auditory as a whole or to start the auditory imagery. (b) A detailed visual image of the thing with the motions and changes that would be involved in producing the sound, and used to reinstate details of the auditory imagery, as well as to merely start it. (c) Visual imagery of arbitrary forms with detailed parts and motions—visual sound analogies—used almost entirely for the recall of auditory details. (2) The verbal processes preceding the auditory consisted of an auditory image of the name of the thing, or of an incipient naming without such an image. Because of its nature it could play no part in the recall of details of a sound. (3) Motor imitations of the sounds consisted of (a) vocal imitation of pitch and quality, and (b) of imitation of the rhythm, which might be vocal, but more usually involved other than the vocal muscles. The function of both was that of recalling auditory details. In by far the majority of instances recall of details of a sound was found impossible without this motor imitation, the two being all but inseparably united. In the estimation from memory of the duration of a sound the auditory image was quite absent as often as it was present, and when present was but rarely used in that esti-

mation. In its place the motor processes used in imitating the rhythm of the sound, and its pitch and quality in a lesser degree, were the basis for judging duration.

Compared with the visual imagery of meaningless forms or of pictures of familiar objects, the auditory imagery of familiar sounds is strikingly poorer, cannot be recalled in detail, is very much more dependent upon other processes for its recall, and probably involves a much higher degree of memory illusion.

Voluntary Control of the Distance Location of the Visual Field.

H. A. CARR.

The paper gave an account of four cases of voluntary control over the distance location of the visual field. With two subjects the volitional movements of the field were accompanied by changes in the distinctness and size of the images, by characteristic motor experiences within the bulb, by changes in the size of the pupil, and by appropriate lenticular adjustments. No eye movements occurred. With the other two cases, eye movements, lenticular adjustments, pupillary changes, kinæsthetic experiences within the bulb, and changes in the distinctness of the visual objects were not present during the voluntary illusion. The conclusion was advanced that the relative importance of the various criteria of depth is an individual variant; that the illusion was conditioned by lenticular adjustments in the one case, while some central factor was operative in the other.

A Practical Illuminator and Its Utility in a Psychological Laboratory. WALTER D. SCOTT.

The author described and demonstrated an instrument for measuring the illumination at any point in doors or out, and also the brightness of surfaces of any color, *e. g.*, colored papers, colored walls, etc. The apparatus is based on the principle of the flicker photometer, and consists of a dark box, in which is an incandescent electric light, carefully standardized, and run by a constant current. The light from this is reflected from a matt surface into the observer's eye, but is interrupted at intervals by means of a rotating half disk, which consists of a mirror, reflecting the light which it is desired to measure. The distance of the standard light is adjustable, and by this means the distance can be found at which the standard light ceases to flicker with the light to be measured. The author further showed the value of knowing the illumination of the room in which experiments are carried on, and the brightness of objects exposed in experiments. This factor has been neglected in recently published experiments, though such neglect was unjustifiable.

Apparatus for Chronometric Experiments in Psychology. JOHN A. BERGSTRÖM.

A brief description, illustrated by photographs and sketches, of a complete equipment for the usual chronometric experiments, including several new types of apparatus.

The equipment consists of (1) a large, three-rate pendulum chronoscope, a model of which was exhibited by the C. H. Stoelting Co., at the World's Fair in 1904; (2) small two-rate pendulum chronoscopes, which serve for all usual experiments and for practice work by students; (3) exposure apparatus for light, colors, printed words, and pictures; (4) key for touch stimulation; (5) key for sound stimulation; (6) magnet reaction key for usual reactions by the hand; and (7) speech keys for association experiments.

The small pendulum chronoscopes are easily portable.

Cross-Breeding of Ideas as a Factor in Invention. T. H. HAINES.

The central question of psychology is that of organization. The exploitation of imitation has explained much in ontogenetic organization as coming directly through social heredity. But the large question of social advance, and the consequent place of individual invention, is not thereby explained. It is necessary to study the method of the production of mental variations.

Plant and animal breeders facilitate the production of variants by hybridizing. Cross-breeding seems to be especially productive of variations. It seems to upset the equilibrium of organization in parent cells, and so afford opportunity for latent and obscure hereditary elements to come out.

So in the history of science we find it is the impact of dissimilar mental processes, ideas, upon each other which has prepared the way for the arising of productive theories. The scheme or plan is born of the puzzle or problem consciousness. And the problem consciousness is the product of a jarring impact.

Such action of jarring impacts is seen in (1) Darwin's conception of his great theory as he observed South American fossils, plants and animals, under the spell of Lyell's theory. (2) Darwin's reading 'Malthus on Population.' (3) The influence of Priestley's discovery upon Lavoisier. (4) The effect of the discoveries of the Paduan school of medicine on the mind of William Harvey. (5) The effect of the glacial theory of Charpentier and the observation of glacial action in the Alps on the mind of the paleontologist, Agassiz. And (6) the action of the findings of Mitscherlich with regard to paratartric acid on the mind of Louis Pasteur.

The impinging idea is productive of what we may call the *problem consciousness*. It is an awareness of something which is felt to be a possible organization of ideas and functions which the subject is as yet unable to bring clearly into experience. It is also a definition of a want impelling to its own fulfillment. It is thus both schematic cognition and an impelling force driving on to the full realization of the schema.

Herein lies a most important gauge of mental ability and social efficiency. It is partly what is ordinarily connoted by 'scope of attention.' But in addition to this it is also what we may call *demand for the integrity of experience*.

Function and Feeling. R. S. WOODWORTH.

While the localization of brain functions is a physiological task, the determination of what functions there are to be localized is the work of psychology; and so far, psychology has made little progress in this work. Memory, imagination, judgment, reasoning, attention and inhibition, will, are probably general functions or properties of all mental operations, and not localized in special parts of the brain. We ought to be able to analyze mental function according to the subject-matter, and according to the common elements in subject-matter which is at first sight diverse. The methods by which such analysis could be reached, in addition to the study of pathological cases, include: the study of individual differences of a marked sort, the correlation of efficiency in different kinds of subject-matter, the influence of training in one sort of material on efficiency in other sorts, and, possibly, introspection. This last brings up the question how far consciousness corresponds to function—a question which cannot be answered from present knowledge. The view that consciousness attends only the sensory functions is, I believe, contradicted by introspection and by pathology. The view that consciousness attends only the less practiced functions is incompatible with the persistence of sensory consciousness in spite of the enormous amount of practice which those functions receive. The view that consciousness attends only those functions which discharge readily into motor pathways loses sight of the cases of intense feeling with obstructed reaction, and also of the markedly *non-motor tendency* of intellectual activities. Though it is hard to gainsay that every brain activity has an immediate motor result, it is easy enough to show that the motor outflow is often accidental and irrelevant. The absence of direct and appropriate motor response is an essential condition of thinking. Thought, as a

function, is not a motor reaction, but a central reaction or adjustment. Psychology is more essentially a study of function or behavior than a study of feeling; but it would be an extravagant waste to limit the study to motor behavior, leaving out of account the introspective evidences of function.

I would propose as a hypothesis, reasonable enough in appearance and not contradicted by known facts, that each cortical function has its own peculiar feeling, and that the momentary predominance of one feeling over another—its 'clearness'—is after all a matter of intensity, the most active function at the moment occupying the attention.

Paradoxical Fatigue Phenomena in certain Depressions. FREDERIC LYMAN WELLS.

In normal individuals the speed of repeated tapping (as studied by Dresslar, Bryan, Gilbert, etc.) decreases with considerable regularity for the first 30 seconds, after the first second; in cases of manic-depressive depression, however, an extended warming up process is often noted during this period. The tapping rate may increase only for the first five or ten seconds, and then be over-balanced by fatigue, or it may increase through the entire 30 seconds, giving a curve exactly the reverse of the normal. This seems to be a phase of the general susceptibility to 'keying up' influences clinically observed in such cases (*e. g.*, brightening up in the afternoon, or under loss of sleep, etc.), and together with them indicates that the general lowering of psychic tone in these depressions is probably associated with increased sensations rather than conditions of fatigue.

Reactions and Perceptions. JAMES McKEEN CATTELL.

It was argued that perceptions are distinguished from images by the greater prominence of the conative or motor elements. The way we react is as much a part of the psychophysical process as the kind of stimulation, and the motor elements are as integral a part of the perception as the strictly sensory elements. Images and ideas are less likely to be followed by definite movements. The nervous system is so organized that we react to objects, and the more prominent motor elements give superior vividness and reality to perceptions, which enable us under ordinary circumstances to distinguish them from images. Our reactions, as a rule, work and are useful, giving rise to new perceptions, which also work, and thus the material world becomes real for us. Images and perceptions are confused,—we have hallucinations and illusions,—when the motor reactions are

inhibited or are excessive. Thus in sleep, in reverie, in some forms of hypnotism, intoxication and insanity the motor reactions are lacking or indefinite and we have dreams, visions and hallucinations. On the other hand, objects and images are confused when the motor reactions are excessive or unnatural. We cannot separate images from perceptions. Images are revivals of past sensations, and perceptions are mainly supplied by conditions of the central nervous system. Images and perceptions are equally the result of brain changes, which are themselves part of the world's material system. But the brain changes which are excited from within are less likely to result in motor discharges than those which form parts of sensorimotor arcs. This is necessary if the organism is to survive and prosper. The more pronounced motor elements of the sensorimotor arcs are represented by superior vividness in perceptions, as compared with images, and this appears to be at least one of the factors enabling us to construct the world in which we live.

A Case of Experimental Nerve-Division in Man. W. H. R. RIVERS.

The experiment reported was done in collaboration with Dr. Head, who, in order to follow thoroughly the process of recovery of sensation during the regeneration of a nerve, had the radial and external cutaneous nerves of his left arm cut and reunited. During the five years succeeding this operation, as well as before it, the state of the sensibility has been carefully tested. The principal result has been to show the existence of three kinds of sensibility in the parts affected. There is first of all a deep or subcutaneous sensibility, which was not destroyed by the operation; it remained sensitive to pressure and painful stimulation, but not to heat or cold; it gave perfect localization, but no power of spatial discrimination as tested by the compasses, and no power to perceive the shape of objects. This was the only form of sensibility present for some months, after which another form began to return. The skin now became sensitive to prick which was extremely uncomfortable and evoked reflex withdrawal of the hand and cries. Sensitivity to pronounced heat (above 40° C.) and cold (below 26° C.) also returned at this stage, and the hairs gave peculiar tactile sensations in addition to the pain produced when they were pulled. Hot spots and cold spots were sharply defined, and in fact were the same as before the operation. Pain was somewhat less markedly punctiform in distribution. There was however no power of localization (if the subcutaneous sensibility was excluded); the sensations

aroused were diffuse, and sometimes 'referred' to distant parts. Spatial discrimination was still absent, also the power of distinguishing intermediate degrees of heat or of cold. In short, at this stage the sensory function was crude, a warning mechanism with strong reflex tendencies, but not permitting of exact perception of objects. The kind of sensibility so revealed was called by the name 'protopathic.'

Many months later there appeared, creeping down the arm from the point of injury, a third sort of sensibility, which included sensitiveness, without pain, to light touches, such as that of cotton-wool, and to slight degrees of coolness and warmth. The irradiation and reference of sensation disappeared at once; localization, discrimination of the two points of the compasses and of different degrees of heat and cold appeared. The distribution of this form of sensibility was not punctiform. This highest form was given the name 'epicritic.' It was found that cooling the hand after it had reached the epicritic stage would put it back into the protopathic stage. It does not appear that the epicritic stage is simply an intellectual development on the basis of the protopathic stage; for in one small area of the arm, and also in clinical cases observed by Dr. Head, the epicritic sensibility returned without the protopathic ever appearing. It is probable that the two are different senses, with separate systems of nerve fibers.

The Influence of Small Doses of Alcohol on Muscular Activity.
W. H. R. RIVERS.

Kraepelin's modified ergograph was used in testing the amount of work which could be done immediately after the ingestion of a small quantity of alcohol as compared with the work that could be done on other occasions when no alcohol was administered. The conditions of the experiments, the mode of life of the subject, were kept perfectly uniform. In order to avoid any purely mental influence, due to the subject's greater interest in the experiment when alcohol was administered, he was kept in ignorance as to when he received it and when he received a neutral liquid, both being disguised so that they could not be discriminated. Under such conditions it was found that small doses of alcohol produced no effect whatever on the ergographic record. If however the disguise was removed, so that the subject knew when the alcohol was administered, the (apparent) effect of the alcohol was to increase the muscular activity. The results of previous observers, showing a stimulating effect of small doses on muscular activity, are therefore to be explained by the purely sensory effect of the alcohol on the mucous membrane or by the mental factor.

Man, Woman, and Habit: The Conclusion Havelock Ellis Missed.

H. AUSTIN AIKINS.

At the conclusion of an earlier edition of *Man and Woman* Ellis says that woman is 'more primitive' than man; but does not explain what that means. In his last edition he omits this phrase and gives instead some half-dozen main points of difference between the two sexes.

My point is that all these points of difference can be explained as different aspects of this one difference: *Men have a greater tendency than women to form habits and to use them*, to build them together, and to build one on another, to reconstruct the personality on a basis of habit. This principle explains some facts that Ellis mentions but can't explain (*e. g.*, that woman's greater sensibility to immediate impressions does not hold of smell and taste as it does of sight).

Ellis can't tell whether his half-dozen general points of difference are native or acquired; but I can. For a greater or less tendency on the part of either sex to respond by habit to experience cannot possibly be a result of experience but only of natural selection. The difference between the two is therefore a true secondary sexual characteristic.

The possibility of fitting all or nearly all of Ellis's 'facts' together under one general principle tends to strengthen the 'facts' themselves, even though many of them be based upon mere general impressions.

A conclusion as broad as mine cannot be upset by the skull measurements cited to disprove Ellis's 'greater variability of the male' or by any other single set of comparisons in a very restricted sphere.

If my conclusion is correct, it tends to strengthen the evidential value of general impressions.

Group Self-Consciousness: A Stage in the Evolution of Mind.

F. C. FRENCH.

Between the merely objective consciousness characteristic of the lower animals and the individual self-consciousness that we find in ourselves there is another type of mentality which may be called group-consciousness, or more explicitly group self-consciousness. Man's fundamental personal conception is an 'our' or 'we' in which 'I' and 'my' are included but not distinguished. Evidence for the view that primitive man thought predominantly of the group-self rather than of the individual self is found in certain facts of language, in the universal submission of savages to tribal custom at the expense of all individual freedom, in the early conception of responsibility for crime as tribal rather than individual, in the communal holding of property, and

in the fact that religion is originally a tribal interest of which we find numerous survivals in later times, as, *e. g.*, in the civic religions of Greece and Rome.

The mob-mind and other forms of the crowd psychosis with which we are familiar to-day are survivals of, or atavistic returns to the group self-consciousness which was the predominant mental attitude of primitive man.

If this view is accepted it has an important bearing on the problem of moral evolution. However many biologically and socially useful modes of conduct may be brought about by instinct, custom, law and religion, morality as such is self-imposed conduct. It must, therefore, involve self-determination, self-judgment, and is possible only in a being who has attained to individual self-consciousness. The moral-consciousness, then, is not to be looked for in animals, or even in primitive man, but only after a considerably individualized stage of human development has been reached.

Intelligence and Imitation in Birds; a Criterion of Imitation.

JAMES P. PORTER.

Some Facts Regarding the Behavior of Noddy and Sooty Terns.

JOHN B. WATSON.

A large colony of noddy and sooty terns goes annually for the nesting season to Bird Key, a small coral island belonging to the Dry Tortugas group. During the past year (1907), this colony contained approximately 1,400 noddies and 20,000 sooties.

The feeding and nesting habits of the birds were carefully studied during the various stages of the nesting season. Their instinctive reactions were found to differ markedly during the periods of (*a*) laying (mating, construction of nest, etc.), (*b*) of brooding (26 days for sooty, 35 days for noddy) and (*c*) of rearing the young.

It was found that the reactions of the adults in the wild state could be controlled by using the nest (and nest environment) as a stimulus — the birds will overcome difficulties and will remove obstructions in order to reach the egg. In experimenting upon the nests, it was found that the birds displayed a wonderful ability to orient themselves with respect to the exact position of the nest locality. Some tests were made in order to determine the accuracy of the birds' adjustments to their nests. The slightest lateral displacements of the nest disturb their reactions to a marked degree, while vertical displacements, on the other hand, do not disturb their adjustments in nearly so serious a way.

These terns possess in a high degree the function of orienting themselves from a distance. Birds individually marked were sent to Key West (65.8 statute miles), to Havana (106 statute miles) and to Cape Hatteras (along-shore route, 1,081 miles). All the birds returned from Key West and Havana, while three out of the five sent to Hatteras returned (the other two possibly may have returned). The farthest distance to which these birds go for food had previously been determined to be about 14 knots. It is extremely difficult to understand how these birds could have established visual associations extending over so wide a territory as the above. This is especially true with reference to Cape Hatteras, since it is far beyond the range of distribution of these tropical birds.

The young of both species were reared by hand. The genesis of instinctive reactions was studied in detail. Interesting confirmation of Lloyd Morgan's statements was obtained, with respect (1) to the lack of fear in young birds when reared by hand, (2) to the effect that discrimination (of food stuffs, etc.) is not a native reaction but an acquired one.

When the birds were sufficiently mature, they were required to learn Porter's simple maze. A difference in the learning process between the two species was found to exist. This difference was found to be entirely in line with the differences observed in the behavior of the adults of the two species.

PSYCHOLOGICAL LITERATURE.

ATTENTION.

L'attention spontanée et volontaire. EDOUARD RœHRICH. Paris, 1907. Pp. 174.

In his monograph on attention M. Rœhrich treats the subject under the general topics of (1) primitive or spontaneous attention, (2) apperceptive attention and (3) voluntary attention. Each of these in turn is discussed under the general headings of the psychology, the laws and the practical application of attention.

The author finds that primitive or spontaneous attention in the past has been neglected by psychologists of whom he quotes a number of examples. It is this primitive attention which he wishes to emphasize. Primitive attention is such as is excited by the shock of an impression from without (p. 20). A number of examples from the psychological laboratory are brought forward to show the peripheral and external causes of such attention. Thus the fluctuation of attention, the visual adjustments excited by spacial relations and the various optical illusions are in part due to external stimulation.

In practical life primitive attention plays an important part. It is so combined with other elements however that laboratory experimentation is necessary before it can be clearly defined and selected from the complex processes in practical adjustments. Spontaneous attention is excited by an external object which results in organic and peripheral tensions. Further interpretation of the exciting cause then becomes possible (p. 54). Thus the report of a cannon startles one and excites attention. Further action then follows. Once attention is aroused by the object which breaks violently into consciousness there may follow closer investigation, interpretation and analysis. These later stages of interpretation and judgment are not a part of the original spontaneous attention. Men often make use of the startling nature of situations to attract the attention of others. Thus placards with large letters, colored pictures, loud cries, etc., attract us. Children especially are appealed to by these means (p. 59). In its early stages education makes use of primitive attention. Art, too, recognizes its value. Combinations of colors, arrangements of form, musical rhythm and harmony show an instinctive appreciation of the laws of spontaneous attention.

Of the laws of primitive or spontaneous attention we have the following: (1) The degree of primitive attention depends not on the intensity of the stimulus but upon its vividness. In this connection vividness is independent of intensity. The more vivid an impression is, the greater is its exciting power. The more intense an impression is, the more does it tend to deaden consciousness (p. 63).

(2) That external stimulation may result in primitive attention further interpretation of the stimulus must follow (p. 64).

(3) The time between the impression and the following interpretation or reaction is longer if the excitation is unexpected (p. 64).

(4) If succeeding impressions are too close together or too far apart, judgment and interpretation become more difficult or even impossible (p. 64).

(5) An object cannot be fixated more than a few seconds at a time (p. 65). In this connection see James, *Principles of Psychology*, I., 420.

(6) When primitive attention is simultaneously excited by a number of stimuli the following results are possible:

(a) If the stimuli are different in quality and independent of one another, judgment and interpretation are weakened.

(b) If the stimuli are different in quality but bound together in some common object, judgment gains in precision.

(c) If a number of objects or groups of objects excite attention, four or five may be dealt with at once with equal precision.

(d) If the stimuli are capable of fusion as are sounds or colors, the individual concerned may perceive new and supplementary impressions in addition to the original stimuli. This happens in the case of first and second difference-tones (p. 66).

These laws give rise to the following maxims or rules (p. 66):

(1) To hold primitive attention the impressions should be graded in intensity and vividness (p. 67).

(2) To excite and sustain primitive attention each impression should be separate and distinct so that it forms a whole and so that it may be properly assimilated by the individual attending to it (p. 68).

(3) When many impressions follow one another a proper time must elapse between them. If the time is too short the resulting perplexity and confusion are followed by bad judgment or by none at all (p. 69).

(4) To stimulate primitive attention one must use impressions of a different quality provided they belong to the same object (p. 70).

(5) To arouse and sustain primitive attention one must properly educate the senses (p. 71).

After treating of primitive attention M. Rœhrich takes up apperceptive attention. This kind of attention exists when the impression coming from without excites mental ideation and is assimilated or apperceived by images, ideal or mental complexes or groups. Thus an astronomer will see a new star at once because of the masses of images and ideas which he has of the stars and of the heavens. So too a shepherd will at once notice the gap made by a missing member of his flock (p. 73). Apperception in this case refers to the mental assimilation of the new impression (p. 75). Feeling has little to do with the matter. If feeling is excited it tends to interfere with the intellectual processes. In fact a strong feeling of fear may result in an effort to get away from the object (p. 77). Curiosity however is productive of apperceptive attention.

The mechanism of apperceptive attention is somewhat as follows :

(1) There is present a mental background of ideal complexes and groups more or less connected.

(2) The shock of an impression brings into prominence one or more of these mental groups.

(3) There results a tension in the form of curiosity, expectation, interest.

(4) Finally the new impression is absorbed by the ideal masses already existing (p. 80).

In practical life the orator, the playwright, the pedagogue, the politician and the writer recognize apperceptive attention. The orator will first rouse common sentiments and will appeal to popular beliefs before introducing his new ideas. The dramatist will center his play about some old theme or hero. The teacher will seek to rouse what is known in the child's mind and connect it with the new matter which he has on hand. The politician must regard the wishes and ideas of his constituents. Modern writers of novels refrain from preaching directly. They present the facts in an attractive manner, give the story and allow the reader to interpret it and give it point and application.

The one law of apperceptive attention is this. In every act of consciousness not directed by the will the accuracy and the rapidity of consciousness depend upon the extent, the variety and the proper coördination of the associated ideas. From this we get the following rules and maxims :

(1) To ensure apperception one does not have to present a new notion so long as it seems to be new (p. 104).

(2) To facilitate apperception one must present an idea similar though not identical with the old ideas (p. 105).

(3) The new idea should be connected with the old by a series of graded and progressive steps (p. 107).

(4) Between two states of apperceptive attention there should be a sufficient time to allow of proper assimilation (p. 109).

The third part of the book is devoted to voluntary attention. This form of attention is distinguished from the other forms in that it has (1) anticipation of an end, (2) choice and (3) conscious effort (p. 119). Anticipation of an end is more or less indefinite. A number of ends may be presented for selection. Choice of one in preference to the others is made. Effort is felt in the realization or in the attempted realization of the end. In positive effort an endeavor is made to act and do something. In negative effort such activity is withheld and inhibited. As a whole, in all its forms, attention may be considered as a state of mental tension which may vary from simple innervation to effort and from effort to active volition (p. 160).

The author concludes his excellent work with certain minor questions, as the relation of voluntary attention to memory, to apperception, to observation, etc.

The work of M. Rœhrich is extremely valuable for the many practical suggestions which he embodies in it. He should have paid more attention to English and American psychologists, as Stout, McDougall, Titchener, Baldwin, Sanford, Ladd, Dewey, to name only a few. The motor side of attention would then have probably received a fuller treatment. This however is simply a possible correction *in extenso* and does not affect the work as far as it is given. It is of note that this monograph on attention received the Prix Saintour, 1905, by the *Academy of Political and Moral Sciences*.

FELIX ARNOLD.

NEW YORK CITY.

Fluctuations of Attention to Cutaneous Stimuli. L. R. GEISLER.
Amer. Jour. of Psychol., 1907, XVIII., 309-321.

Because of the lack of agreement in the results of previous investigators the author was led to take up these investigations upon the fluctuations of attention. At first he undertook to repeat as far as possible the experiments of Wiersma who came to the conclusion that the fluctuation of the attention was proportional to the intensity of the stimulus and then he turned to Ferree who had concluded that no fluctuations were experienced. In following Wiersma's experiments two sets of observations were taken under the same external conditions. In the first Wiersma's series of weights were used. The liminal, which

was 7.4 grams, did not prove to be the liminal for Geisler's reagents. In the second set of experiments a lower series was used and slight changes in time and area stimulated were made. At the end of each trial the reagent wrote out an 'introspective account of the course and content of consciousness.' The results here obtained were opposed to those of Wiersma. No fluctuations were perceived. The author concludes that both liminal and subliminal area stimuli applied to the skin change their character and tend to disappear after the lapse of several minutes and the attention experiences no kind of fluctuations for at least two or three minutes. In attempting to repeat Ferree's experiments with electro-cutaneous stimulation he experienced some difficulty in eliminating touch, pressure and taste sensations. By making use of cocaine he obtained results that accord with those of Ferree. The final conclusion of his experiments was that under favorable conditions attention focused upon liminal and subliminal sensations remains approximately constant for at least two or three minutes and then it gradually fades out in consequence of adaptation.

Attention Fatigue and the Concept of Infinity. ROWLAND HAYNES. Jour. of Philos., 1907, IV., 601-606.

The purpose of the paper is to suggest a relation between 'diffusion of attention as one element in' intellectual fatigue and the metaphysical concept of infinity.' There are two kinds of concepts, 'content-images and word-images.' Content-images are used for all but the most formal reasoning. Content images are necessary for such a discussion as that of infinity. After citing many examples of images called forth by such words as space, he finds that each of these images involves 'an undifferentiated something which induces smothering of attention.' Since the smothering of attention is always an element in the concept of infinity, it is the essential element of that concept. Three suggestions grow out of the above theory. When the organism is fatigued by overwork or excitement, smothering of attention is very easy. This is the case in those mystic states in which 'oneness with the Infinite figures so largely.' The knowledge of the infinite is impossible, because knowledge involves 'the fluttering of attention over the different features of any given percept.' A relation may be established between the concept of infinity and attention fatigue which will bring us nearer to finding a physiological basis for metaphysical concepts.

ALICE M. BATTY.

UNIVERSITY OF NEBRASKA.

MEMORY.

Effect of Changes in the Time Variables in Memorizing, Together with some Discussion of the Technique of Memory Experimentation. JOHN A. BERGSTRÖM. Amer. Journ. Psych., 1907, XVIII., 206-238.

This paper is divided into seven sections. In the first the writer points out the psychological and pedagogical meanings of the problem of the effect of altering the various time factors in memorizing. He also notes that the study is complicated by the fact that although exposure-times and intervals between members of series can be accurately limited and although the pulses of 'conscious attention' can be made fairly parallel to the objective series of impressions, yet the nervous processes involved cannot be thus severed and may perhaps overlap. The second section contains a brief account of the methods of procedure thus far employed in memory investigations. The writer supplies for *Erlernungsmethode* and *Treffermethode* the happy English equivalents of 'method of complete memorizing' and 'method of right associates.' The third section deals with experimental technique, and describes a noteworthy compound interrupter and exposure-drum designed by the writer. The most signal advantage of this apparatus is that it makes easy the independent and measurable variation of the three time-factors in memorizing series, namely, the exposure-time of the members, the intervals between exposures, and the interval between presentations of the series as a whole.

The fourth section describes a series of experiments made in 1895 by Superintendent Sanders in coöperation with the writer. The method used was a form of the method of retained members (*Methode der erhaltenen Glieder*) to which the writer does not apply any particular name. The presentation was oral. The experiments were not extensive but would seem to indicate that 'the acquisition and retention of a series of associable words varies approximately as the logarithm of the interval at which the words are spoken, the shortest interval being that which barely permits a clear pronunciation.' The intervals compared were 0.5, 2 and 3 seconds. The learning of series of letters in accidental order proved much less dependent upon the interval between the members. Supplementary experiments tended to show that 'dysassociable' words stand half way between letters and easily associable words in their dependence upon this interval. The fifth section reports work done in 1903-1904 with the apparatus mentioned above, by Superintendent Herrington, also in coöperation with the writer. This work included three sets of experiments, with series

of syllables, one set for each of the three time-variables. (1) Variation of the exposure-time had little effect on the results. The times tested were 41, 82, 164 and 3.18 σ . The second was most agreeable to the subjects. (2) Increasing the intervals between syllables decreased the number of omissions and wrong insertions, but increased the number (relatively very small) of mistakes in order. (3) Increasing the interval between presentations of the series decreased the number of errors.

The sixth section of the paper describes the work with time-variables of Miss T. L. Smith, Ebbinghaus, Jost, Miss Lottie Steffens, Ogden, Frl. Ephrussi and Reuther. The seventh section furnishes the writer's own construction of all the data in hand. Alteration of the time variables certainly affects 'the reception and association of the impression,' that is, 'the amount of apperceptive apprehension of the material and its connections.' However, the increase of difficulty in memorizing with decrease in the intervals may well be due in part to the repressing of motor reaction to the series-members and in part to the cutting short, by the reception of a new impression, 'of a more or less unconscious organizing process continuing some time after the impression has been received and necessary for its permanence and revivability.'

In the opinion of the reviewer, the writer has not taken sufficient pains to bring out his points succinctly but has made the text of this valuable paper unnecessarily hard reading.

E. A. MCC. GAMBLE.

WELLESLEY COLLEGE.

Problems in the Analysis of the Memory Consciousness. F. KUHLMANN. Journ. Philos., Psychol. and Scient. Methods, 1907, IV., 5-13.

Mr. Kuhlmann in stating the main problem now at issue in the analysis of the memory consciousness lays stress upon the presence in memory of organic factors. The discovery, he says, of such organic factors in recognition has caused a wide divergence from the view of memory as made up of special sense-images. There arises, however, the fundamental question whether these organic factors are 'organic images' or 'actual organic sensations'—a question whose answer involves the building up of a psychology of organic sensations. If this question were answered, we should have left the purely analytical problem of the relation, in general, of organic images to special sense-images in emotional and perceptive memory of their function

as mediating, concomitant or inhibitive factors in recall; and of their aid in recognition to judgment of the correctness of special sense-images. Much light may be thrown upon the analysis of the memory consciousness by work along these lines supplemented by introspective study of the nature and causes of memory illusion.

ANNE L. CRAWFORD.

WELLESLEY COLLEGE.

DISCUSSION AND CORRESPONDENCE.

THE EGO AND EMPIRICAL PSYCHOLOGY—A REPLY.

Apparently the art of successful polemic lies in assigning to your opponent an indefensible position and then massing your guns on its vulnerable points. I had no intention of making use of these tactics in the remarks to which Professor Calkins takes exception in the January number of the *BULLETIN*, and in fact had no one specifically in mind in connection with many of the phrases that she cites. All criticisms are, like universal judgments, the apodoses of understood hypotheses, and if Miss Calkins is not among those who use the self-psychology as a fourth dimension in which they may take refuge when some cherished opinion is too closely pressed by recognized fact and mundane logic, my remarks of course do not apply.

In my turn I should like permission to disclaim certain of the theories that she lays at my door. In particular I did not base any of my argument upon the assumption of the passive stream of consciousness, which I am quite as much concerned as she to show is a pure abstraction. In fact she entirely omits to mention the facts and arguments that I make use of in the article, and I would ask the reader if interested to look to the original for an outline of the argument rather than to her summary. My starting point is the same as my critic's, the mental content as immediately experienced. Our ways diverge only in that I believe that both mental content and self are abstractions that have existence only in so far as they can be made to explain experienced fact. I was concerned only with the abstract self in the paper in question and that I tried to show is not suited to explain the facts that it was devised to explain. I turn then to immediate experience and endeavor to show that the functions that are usually assigned to the self can be derived from known aspects of the immediately given. But I repeatedly state that that given is active not passive, concrete not abstract.

I am not sure that I have any deep-seated objection to the tag of

'structuralist,' but I have been wondering since reading Professor Calkins' discussion which of us is the structuralist and which the functionalist. In reference to the will, for example, my critic appeals from the admitted facts of structure to find will not in function but in a concrete feeling, and that can be nothing but a structure. She finds evidence for the self, again, not in function, but in direct consciousness, at the most but new form of content. Even force, which I use most innocently to designate an observed function, she can understand only as a mysterious structure on the same level with her 'self.' Both will and self I would class as functions. Will is the function of masses of experience, in part immediately present, in part more or less remote, so far as they are active in the control of action. In the same way I would define self as the function of all that we are, active in the interpretation of new experiences and in taking them up into the persistent unity of experience. Force exerted by early or recent experience seems to me to correspond to an immediately observed fact, and to be at once distinct from the associative process, though related to it and to be function, not structure. Indeed, I cannot see that force in any use of the term, physical or metaphorical, could be a structure. I of course have no time here to discuss the point as to how it differs from association, but can only refer to my forthcoming volume on Attention.¹ In fact, it seems to me that Miss Calkins is inclined in general to make a function stand alone unrelated to any structure and so to make it a slightly different sort of structure, not a real function as I understand it. In the only conceivable view of the matter the figure of function and structure can be applied only if it is assumed that structure and function are inseparable. It is certainly possible that one may be known better than the other. This is the case at present with meaning, where the function is matter of universal agreement, while the structure is relatively unknown, or at least in dispute. But an instance of this kind merely compels us to confess ignorance as to what the structure may be, not to deny its existence. I make these remarks with no desire to seem to instruct the champion of functionalism but to save myself from further misunderstanding.

As for the argument from the use of the personal pronouns, that it seems to me is of a piece with an attempt to prove the ptolemaic astronomy from the currency of the word 'sunset.' 'I' means for me one function of experience as a whole, and I cannot see why it should be monopolized by any (structural?) abstraction from that whole. As I understand it, the facts of the case are not in dispute between us; it

¹Published by Sonnenschein, London.

is merely the interpretation of the facts. The pronoun refers to the fact, not the theory.

W. B. PILLSBURY.

UNIVERSITY OF MICHIGAN.

A CASE OF ANIMAL ADOPTION.

The following personal letter reports an incident of interest to comparative psychologists. The date of the letter is explained in the writer's postscript.

J. MARK BALDWIN.

PALO ALTO, California,

March 5, 1903.

Dear Sir:

I do not know whether you will be interested in the case of 'adoption' that has come under my notice recently, but my interest in it was greatly increased by the reading of Groos on the Play of Animals at the time the incident happened.

One of a herd of eleven cows gave birth to a calf. The calf was first seen by my father-in-law, Mr. Thomas, the owner of the cows, at ten o'clock in the morning, on February 26. She was then alone with her calf. During the day she led the calf to the rest of the herd in the large pasture, where there were also some mules. At three o'clock in the afternoon a she-mule had adopted the calf and driven the mother away. The mule staid close to the calf all the time, and between it and the cow. The latter is not afraid of dogs, and does not yield easily to other animals; in her own herd she stands third in the hierarchy of authority, but she did not dare to approach her own offspring. We do not know whether there had been a fight for 'possession.' In the afternoon Mr. Thomas undertook to drive the calf with its mother and the rest of the herd to a shed over half a mile off, and he had to put up a vigorous fight with the mule over the whole distance, not only to drive the calf, but to protect himself from the mule. When he finally reached the shed it took two of them to get the calf away from her and run it into the shed. Mr. Thomas is an old man who has had a very large experience with animals, but he declares that it was one of the hardest fights he ever had with an animal, and does not care to repeat the experience, although it was very interesting to him.

The mule was even more anxious about the calf, and very much more excited than its own mother was, and her anxiety was great. At

the shed the mule sought to regain possession by making a fierce charge through the herd and against the drivers.

I am aware of how mules 'get struck on the bell-mare,' but have never heard of a mule's taking possession of a young animal in that way, and do not recall a case of one animal taking away the offspring of another by force for adoption. It has seemed especially romantic to me from the fact that mules do not have offspring of their own. This may be a common incident, and of no special significance, but I have related it to you with the thought that it may perhaps be worth preserving.

Yours very sincerely,

FRANK CRAMER.

Sept. 5, 1907.

P. S. — This letter was written over four years ago and then laid aside with the thought that perhaps you would be less interested than I. But the facts still interest me. I was careful to verify every detail of the incident.

BOOKS RECEIVED FROM JANUARY 5 TO FEBRUARY 5.

The Philosophical Basis of Religion. J. WATSON. Glasgow, Maclehose; New York, Macmillan, 1908. Pp. xxvi + 485.

La Psychologie devant la Science et les Savants. E. BOSCH. 3^e éd. Paris, Daragon, 1908. Pp. 392. [Devoted to various phases of the occult which it takes several lines to enumerate in the sub-title.]

The Inward Light. J. F. HALL. New York and London, 1908. Pp. 228.

An Introduction to the Mechanics of the Inner Ear. M. MEYER. Univ. of Missouri Studies, Science Series, II., 1. Univ. of Mo., 1907. Pp. 140.

Skeletal Remains Suggesting or Attributed to Early Man in North America. A. HRDLICKA. Bur. of Amer. Ethnology, Bull. 33. Washington, Gov. Printing Office, 1907. Pp. 113.

Principes de Linguistique psychologique. Essai de synthèse. J. VAN GINNEKEN. Leipzig, Harrassowitz, 1907. Pp. vii + 552.

Mental Pathology in its Relation to Normal Psychology. G. STÖRRING. Trans. by T. LOVEDAY. London, Sonnenschein; New York, Macmillan, 1907. Pp. x + 298. \$2.75 net.

The Negro Races, a Sociological Study. Vol. I. The Negritos, the Nigritians, the Fellatahs. J. Dowd. New York and London, Macmillan, 1907. Pp. xiii + 493.

Plato's Psychology in its Bearing on the Development of Will. MARY HAY WOOD. Oxford Press; New York, Froude, 1907. Pp. 63. 2/6.

Zeitschrift für Aesthetik und allgemeine Kunstwissenschaft. Hrsg. v. MAX DESSOIR. Bd. III., H. 1. Stuttgart, Enke, 1908.

NOTES AND NEWS.

PROFESSOR CARL E. SEASHORE, head of the department of philosophy and psychology, has been elected dean of the graduate college in the State University of Iowa.

PROFESSOR G. M. STRATTON, of the Johns Hopkins University, has accepted a call to the chair of psychology in the University of California, his duties there to begin in the fall of 1908.

